



UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

Mail Stop 6010

November 10, 2008

VIA U.S. MAIL and FACSIMILE (978) 787-9027

Ms. Stephen G. Bassett
Axcelis Technologies, Inc.
Executive Vice President and Chief Financial Officer
108 Cherry Hill Drive
Beverly, MA 01915

**RE: Axcelis Technologies, Inc.
Form 10-K for the fiscal year ended December 31, 2007
Filed March 17, 2008
File No. 000-30941**

Dear Mr. Bassett:

We have reviewed your filing and have the following comments. We have limited our review to only your financial statements and related disclosures and do not intend to expand our review to other portions of your documents. Where indicated, we think you should revise a filings in response to these comments. If you disagree, we will consider your explanation as to why our comment is inapplicable or a revision is unnecessary. Please be as detailed as necessary in your explanation. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure. After reviewing this information, we may raise additional comments.

Please understand that the purpose of our review process is to assist you in your compliance with the applicable disclosure requirements and to enhance the overall disclosure in your filing. We look forward to working with you in these respects. We welcome any questions you may have about our comments or any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

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Form 10-K Annual Report as of December 31, 2007

Note 9. Other Assets

1. Please tell us why you have not classified the cost and amortization of products manufactured for internal use as Property, Plant and Equipment.

Form 10-Q Quarterly Report as of March 31, 2008

Form 10-Q Quarterly Report as of June 30, 2008

Consolidated Balance Sheets, page 4

2. Please tell us why the investment in SEN increased significantly at March 31, 2008 and decreased at June 30, 2008. Tell us where you have disclosed the reason for these changes in the equity investment and the related accounting treatment in your filings.

Note 2 – Stock-based Compensation, page 7

3. Please tell us where you have provided the disclosures required paragraphs A240-241 of SFAS 123R.

Item 2. Management's discussion and Analysis

Liquidity and Capital Resources, page 18

4. Please revise future filings to clarify how you plan to meet the redemption of your convertible subordinated debt of \$81 Million due on January 15, 2009.

Form 10-Q/A Quarterly Report as of March 31, 2008

5. We note that the certifications required to be filed with the report are incomplete. These only have the first 3 items. Please amend your filing to provide the appropriate certifications. Refer to Item 601 of Regulation S-K.

Form 10-K/A Annual Report filed on September 29, 2008

6. We note that the amended filing does not contain the entire text of Item 15. Please amend your filing to include the entire content of Item 15 of your annual report. Refer to Rule 12b-15 of the Exchange Act.

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As appropriate, please respond to these comments within 10 business days or tell us when you will provide us with a response. Please furnish a cover letter with your response that keys your responses to our comments and provides any requested information. Detailed cover letters greatly facilitate our review. Please understand that we may have additional comments after reviewing your responses to our comments.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filing to be certain that the filing includes all information required under the Securities Exchange Act of 1934 and that they have provided all information investors require for an informed decision. Since the company and its management are in possession of all facts relating to a company's disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

In connection with responding to our comments, please provide, in writing, a statement from the company acknowledging that:

- the company is responsible for the adequacy and accuracy of the disclosure in the filing;
- staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filing; and
- the company may not assert staff comments as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

In addition, please be advised that the Division of Enforcement has access to all information you provide to the staff of the Division of Corporation Finance in our review of your filing or in response to our comments on your filing.

You may contact Jong Hwang at (202) 551-3327 if you have questions about these comments. In this regard, please do not hesitate to contact me at (202) 551-3676 with any other questions.

Sincerely,

Brian Cascio
Accounting Branch Chief